NOMA
Network Operator Measurement Activity

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http://www.techark.org

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Comcast

NOMA Objective

- Network Operator Measurement Activity
    - http://www.techark.org/noma
- Collaborative industry activity to share measurements of network function
    - Measured by the network operator itself
    - Contributed to share a collective picture of the Internet's health

Desired outcome for the Internet

- An actual measure of the Internet's stability and health.
  - Starting with v6 performance (as a ratio with IPv4)
- A target for new operators (e.g., in developing economies) to shoot for, in terms of performance and "what good looks like"
- Promoting more networks to be objectively introspective

Operators – what's in it for them

- Self-instrumentation is feasible
  - In-network measurement software
  - RTT against fixed sites
- Gives concrete operational guidance
  - Gives a clear indication when there are issues
    - E.g., service is failing to properly serve from "near"

Sharing?

- World IPv6 Launch continues to show "IPv6 user uptake" in participating networks
  - http://www.worldipv6launch.org/measurements/
- Source of the data
  - Google, Facebook & Yahoo! were main content provider participants
  - They were already measuring traffic over v6 versus v4
  - Could not share the data directly (business sensitive)
- By collaborating and contributing to a neutral 3rd party that can merge the data, the world gets a view into IPv6 uptake that would otherwise be known only to large content providers

Complementary perspectives

GETTING A GRIP ON IPV6 DEPLOYMENT

The Content Provider Perspective

- Sees origin IP address and can map back to origin AS
- Can measure how much of their service is being accessed over which protocol
  - From those customers using their service
- Pluses
  - Complete picture of use of the content provider service
- Minus
  - Doesn't give an indication of how much capability there is for IPv6 in a given AS – non-users of the content provider

Network Owners See the Other Side

- Network operators see all the traffic originated in their networks

- Can reach out from any point in the network to external services to measure

- Have the detail to map individual (origin) IP addresses to neighbourhoods

AN INSTRUMENTED NETWORK CASE STUDY

Basic IPv6/IPv4 Measurements

John Jason Brzozowski

Objective

- Implement and deploy a base measurement
- High-level goals
  - Verify that IPv6 is working as intended
  - Compare performance of IPv6 versus IPv4 over time
- Develop approach that can be used from different points in the network
  - Core, Access, Home, etc.

Implementation

- Centralized database of test targets
- Storage of test results
- Example measurement using HTTP/S over IPv6 and IPv4
  - DNS lookup times
  - TCP connect times
  - Download or transfer times

Scope

- Initially measurements originate from the core network
- Extendable to include:
  - Access and home networks
- Same base code, designed for small form factor devices
  - Extensible to include more robust functionality

Deployment

- Measurement system deployed since before World IPv6 Launch
  - Data collection has been running for over 4 years
  - Largely at 5 minute intervals
- Other data elements are also being captured
  - Traceroutes, pings, etc.

WRAP UP

So far and upcoming

- Held an invitational workshop in June 2016
  - Half a dozen operators
  - Interest – for themselves, sharing
  - There will be a published report
- Looking forward
  - Leverage and share the Comcast experience
  - Getting some agreement on an initial set of internal targets (template) and sharing